MER Shift Reports

STS-107

Launch Report

STS-107 Hydraulics/WSB
Ascent Shift Report
11:30 AM
017/17:30
1/16/03

Summary
HYD/WSB performance during pre-launch and Ascent was nominal. WSB cores were loaded with ~ 5.0 LBS of the additive mixture (53% water; 47% PGME). Nominal WSB cooling performance was observed on all three HYD/WSB systems. System 3 initiated spray cooling ~ 6 seconds post-MECO while systems 2 and 1 started ~ 32 seconds and 1 min 32 seconds post-MECO, respectively. No APU Lube Oil overcools or undercools occurred.

Pre-launch
HYD & WSB Performance
Circ pump operation during prelaunch was nominal. There were two bootstrap accumulator recharges during pre-launch, one each systems 1 (2192 to 2465) and 3 (2143 to 2465). No HYD or WSB anomalies noted during prelaunch. The WSB READY indication was exhibited on all three WSB systems shortly after the WSB GN2 isolation valves were opened.

Ascent
WSB Performance
WSB lube oil temperatures at spray start were as follows (spec is NGT 275 deg F)
System 1 = 233 °F (Lower then the 250 set point but consistent with previous flights)
System 2 = 249 °F
System 3 = 257 °F

Water spray boiler usage during ascent for spray cooling was as follows (spec is NGT 8 LBS/SYS)
System 1 = 2.5 lbs
System 2 = 2.5 lbs
System 3 = 3.1 lbs

Hydraulics Performance
Priority valve reseats at APU shutdown were nominal. (spec is NLT 2675 psia)

System 1 = 2720 psia
System 2 = 2704 psia
System 3 = 2784 psia

Jeffery S. Goza HYD/WSB SSE –Boeing Houston OPS
Charles A. Ritrivi HYD/WSB SSE –Boeing Houston OPS
David D. Beaugh HYD/WSB SSE –Boeing Houston OPS
Farzad "Fred" Rezayat HYD/WSB SSE –Boeing Houston OPS

STS-107 MEDS Launch Report

Launch Shift (0630-xxxx Hours)

MEDS is on Console. MEDS performance remains nominal.

MEDS is GO for Launch.

MEDS performance remains nominal through OMS insertion.

MEDS performance remains nominal through "Go for Orbit OPS".

MEDS is off Console.

(NOTE: Following a successful launch, MEDS MER support will be on call until Landing-4 hours.)

NASA: D. Siner, J. Newsome
Boeing: B. Bynum, C. Gentz, J. Stanley

STS-107, OV 104 D&C Mission Status

- **No Problems or funnies were reported on Display and Control.**

Avionics Engineer

Brian J. Kang
Andy Farkas

AVIONICS
FLIGHT CONTROL / GNC DAILY REPORT

01/16/03

STS-107
Launch Report
(Flight Day 1)

Flight control and GN&C performance was nominal throughout launch and ascent.

Rich Kagawa

STS-107
MER Comm and Track Shift Report.
GMT 016:16:30
Shift 1

All comm and track systems are operating nominally.

Jeff Stafford, Ken McCrary
Lance Borden, Billy Cowan

MER Comm & Track

STS-107
Hydraulics/WSB Pre-Launch Shift Report
1/15/03
9:00 PM
016/03:00 GMT

HYD/WSB performance during early prelaunch was nominal. Circ pump activation occurred at ~016/02:19 GMT with the initiation of circ pump system 1, followed by systems 2 and 3. WSB Steam Vent Heaters were activated and heater operation was verified at ~016/02:27 GMT when the heater temperatures exceeded the off-scale low indicated temperature of 122 deg. F. Nominal heater cycling occurred on all three systems. A WSB "Ready" indication was verified at ~016/02:48 GMT on all three WSB systems upon opening of the GN2 isolation valves.

Charles A. Ritrivi HYD/WSB SSE Boeing
Jeffery S. Goza HYD/WSB SSE Boeing

STS-107
MER Comm and Track Shift Report.
GMT 016:18:30
Shift 2

All comm and track systems are operating nominally.

At GMT 016:16:35, crew selected manual antenna due to issue with scheduling of TDRS. BFS vectors were okay.

The Ku-Band was deployed at GMT 016:17:54, and the system was powered up at GMT 016:17:58. The RADAR self-test was performed at GMT 016:18:06 and passed.

Marty O'Hare, Martha May

MER Comm & Track

MER Shift Reports

STS-107

Day 1 Shift 2

STS-107 ESD SYSTEMS LAUNCH REPORT
GMT 016:18:00

MPS -

Loading of the external tank was nominal.

HGDS performance was as follows:

	Peak Ppm
Ghe Background	6800
Aft He	10000
O2	0
Aft H2	180
LD 54/55	0/0

The MPS performed nominally during ascent. Dump performance was nominal, with no anomalies reported.

OMS/RCS -

	Left Oxidizer	Left Fuel	Right Oxidizer	Right Fuel	Forward Oxidizer	Forward Fuel
PFS %	89.2	89.0	88.8	88.6	74.8	71.4
BFS %	-	-	-	-	-	-
Interconnect Usage	Left OMS 0.0	N/A	Right OMS 0.0	N/A		

OMS/RCS functioned nominally during the countdown and the subsequent launch.

Launch occurred at 016/15:39:00 GMT.

ASCENT

RCS window protect maneuver was initiated at 016/15:41:07.7 GMT for a total duration of 2.08 seconds. This maneuver fired the F1U, F2U, and F3U thrusters. FRCS performance was nominal.

OMS Assist was a dual OMS engine firing occurring at TIG of 016/15:41:16.7 GMT with the cutoff at 016/15:42:58.9 GMT. The burn time was 102.2 seconds.

ET Photo +X maneuver was performed at 016/15:47:56.8 GMT, and was an 11.2-second, 4 thruster translation.

OMS-1 was not required.

OMS-2 was a dual OMS engine firing occurring at TIG of 016/16:20:23.7 GMT with the cutoff at TBD. The burn time was TBD seconds with a delta-V of TBD fps. The resulting orbit was 146.6 x 156.0 nmi.

The right OMS aft fuselage low point ox drain line temperatures (V43T6237A) decreased to 47 °F, before the heaters turned on. Two OMS Propellant Thermal alarms occurred at 016/16:59:17.4 GMT and 016/16:59:22.2 GMT. To prevent any further PASS SM alarms sounding at 50 °F, SM limits were updated at 328/02:36:52 GMT as follows: V43T6236A at 50 deg F, SM limits were updated at 016/17:28:37 GMT by reducing the SM limit from 50 → 43 °F.

OMS/RCS Switch reconfiguration was configured to A strings at 016/16:40:20.

Forward, Right, and Left pod and crossfeed line heaters were configured to 'A' strings at 016/16:40:20 GMT.

The right OMS fuel totalizer indicated a bias of approximately 10% gage high at pre-launch through OMS-2 burn. During STS-109 pre-launch preparations, the right OMS aft fuel gaging probe was noted to be failed OSH during fuel loading for that flight, and the totalizer showed a similar bias. Prior to loading during STS-109, the aft fuel probe electronic module gave an out-of-spec voltage reading. This condition was waived preflight STS-109 (WK10098R1). Therefore, this signature is the same as seen on the last flight.

Vernier Drivers were turned on at 016/17:57:19 GMT. **Vernier DAP** was enabled at 016/16:57:33 GMT

OMS engine performance was nominal.

RCS PRESSURIZATION LEG FRCS: A LRCS: A RRCS: A

AFT RCS INTERCONNECT CONFIGURATION: Straight feed.

23 of 38 primary thrusters have been fired. The following Primary thrusters were fired during ascent:

F1F		L1A	X	R1A	X
F2F		L3A	X	R3A	X
F3F		L1L		R1R	
F1L		L2L		R2R	
F3L	X	L3L	X	R3R	X
F2R		L4L		R4R	
F4R	X	L1U	X	R1U	X
F1D	X	L2U		R2U	
F2D	X	L4U		R4U	
F3D	X	L2D	X	R2D	X
F4D	X	L3D	X	R3D	X
F1U	X	L4D	X	R4D	X
F2U	X				
F3U	X				

FC/PRSD -
The performance of the FC/PRSD systems during the entire prelaunch and ascent phases was nominal.

The PRSD quantities at the time of launch were:

		TK1	TK2	TK3	TK4	TK5	TK6	TK7	TK8	TK9	Total
LH2	(%)	99.3	99.7	97.9	97.9	98.9	93.9	95.7	93.9	94.4	
	(lbm)	91.4	91.7	90.1	90.1	91.0	86.4	88.0	86.4	86.8	801.9
LO2	(%)	86.0	86.5	86.9	96.1	97.0	99.6	98.3	99.2	99.6	
	(lbm)	672	676	679	751	758	778	768	775	778	6632

The average prelaunch boiloff rates were 0.055 lbm/hr-tank LH2 and 0.19 lbm/hr-tank LO2.

Sufficient reactant quantities are available to support a 16+2 day mission at the predicted average power level of 18.821 kW.

The prelaunch baseline CPM values were recorded at 016:08:30 GMT, approximately 1 hour after the completion of the fuel cell calibration requirement. The values for fuel cell 1 are 4,14, and 38 mV, for fuel cell 2 are 12, 16 and 30 mV, and for fuel cell 3 are 0, 22 and 8 mV, documented in Chit STS0003.

Fuel cell 2 s/n 111 cell voltage readings for cells 4 and 5 exhibited pin sharing. The indications of pin sharing stopped shortly after fuel cell start. Fuel cell 2 does not have soldered pins. This was documented in IPR 107V-0109.

APU -
All APU parameters were nominal during ascent. It should be noted that the ascent telemetry format load, OI 166, was used, which does not display the APU Turbine Exhaust Gas Temperature 2 Sensors, V46T0n40A. APU run times and fuel consumption's are given below:

	START TIME GMT)	STOP TIME (GMT)	RUN TIME (min:sec)	FUEL USED (LBS)
APU 1 (S/N 407)	016:15:34:14	016:15:54:24	20:10	119
APU 2 (S/N 402)	016:15:34:17	016:15:54:32	20:15	121
APU 3 (S/N 308)	016:15:34:19	016:15:54:42	20:23	109

All APU start times were nominal. NGGVM performance was nominal and consistent with previous flight performance. There were no gearbox represses during ascent.

A loose spring clip is suspected to have caused a slight temperature drop in the APU 2 Injector Tube Temperature, V46T0274A, at approximately 016\15:39 GMT. During STS-109, the same sensor on this same APU, S/N 402, appears to have shown a slight temperature rise during this same time period.

Movement of a small amount of hydrazine in the APU 2 fuel pump seal cavity drain line is suspected to have shown a small temperature rise and drop in the APU Fuel Pump Drain Line Temp 2, V46T0270A, near MECO.

HYD/WSB -
HYD/WSB performance during prelaunch and ascent was nominal. The WSB cores were loaded with ~ 5.0 LBS of the additive mixture (53% water; 47% PGME). Nominal WSB cooling performance was observed on all three HYD/WSB systems. System 3 initiated spray cooling ~ 6 seconds post-MECO while systems 2 and 1 started ~ 32 seconds and 1 min 32 seconds post-MECO, respectively. No APU Lube Oil overcools or undercools occurred.

Prelaunch
HYD & WSB Performance
Circ pump operation during prelaunch were nominal. There were two bootstrap accumulator recharges during prelaunch, one each on systems 1 (2192 to 2465) and 3 (2143 to 2465). No HYD or WSB anomalies were noted during prelaunch. The WSB READY

indication was exhibited on all three WSB systems shortly after the WSB GN2 isolation valves were opened.

Ascent

WSB Performance

WSB lube oil temperatures at spray start were as follows (spec is NGT 275 deg F)
System 1 = 233 °F (Lower than the 250 set point, but consistent with previous flights.
System 2 = 249 °F
System 3 = 257 °F

Water usage during ascent for spray cooling was as follows (spec is NGT 8 LBS/SYS)
System 1 = 2.5 lbs
System 2 = 2.5 lbs
System 3 = 3.1 lbs

Hydraulics Performance

Priority valve reseats at APU shutdown were nominal (spec is NLT 2675 psia).

System 1 = 2720 psia
System 2 = 2704 psia
System 3 = 2784 psia

Lonnie Jenkins
ESD Team Leader
01/16/20030

STS-107
OMS/RCS Launch Report

INITIATOR: Arrieta, Dorris, Garza, Jones
DATE: Thursday, January 16, 2003

MET: 000/04:22
GMT: 016/20:01
CENTRAL TIME: 2:01 PM CST

	Left		Right		Forward	
	Oxidizer	Fuel	Oxidizer	Fuel	Oxidizer	Fuel
PFS %	89.2	89.0	88.8	88.6	74.8	71.4
BFS %	-	-	-	-	-	-
Interconnect Usage	Left OMS 0.0		Right OMS 0.0			

1. **OMS/RCS functioned nominally** during the countdown and the subsequent launch.
2. **Launch occurred** at 016/15:38:58 GMT.

ASCENT

1. **RCS window protect maneuver** was initiated at 016/15:41:07.7 GMT for total duration of 2.08 seconds. This maneuver fired the F1U, F2U, and F3U thrusters. FRCS performance was nominal.
2. **OMS Assist** was a dual OMS engine firing occurring at TIG of 016/15:41:16.7 GMT with the cutoff at 016/15:42:58.9 GMT. The burn time was 102.2 seconds.
3. **The ET Photo +X** maneuver was performed at 016/15:47:56.8 GMT and was an 11.2-second, 4-thruster translation.
4. **OMS-1** was not required.
5. **OMS-2** was a dual OMS engine firing occurring at TIG of 016/16:20:23.7 GMT with the cutoff at TBD GMT. The burn time was TBD seconds with a ΔV of TBD fps. The resulting orbit was 146.6 x 156.0 nmi.

   ~ NO ORBIT PATH (LOS CUTOFF)
6. **OMS engine performance** (including ball valves) was nominal.
7. **Forward, Right, and Left RCS helium valves** were configured for orbit at 016/16:30:31 GMT. The current RCS helium regulator configuration is A – GPC (tb – OP), B – CL (tb – CL).
8. **OMS/RCS switch reconfiguration** was completed at 016/16:31:24 GMT.
9. **Forward, Right, and Left pod and crossfeed line heaters** were configured to A strings at 016/16:40:20 GMT.
10. **The right OMS aft fuselage low point ox drain line temperature** (V43T6237A) **decreased** to 47 °F, before the heaters turned on. Two OMS Propellant Thermal alarms occurred at 016/16:59:17.37 GMT and 016/16:59:22.18 GMT. To prevent any further PASS SM alarms sounding at 50 °F, SM limits were updated at 016/17:28:37 GMT as follows: V43T6237A from 50 → 43 °F.
11. **Vernier drivers** were turned on at 016/17:57:19 GMT. Vern DAP was enabled at 016/16:57:33 GMT.
12. **The right OMS fuel totalizer** indicated a bias of approximately 10% gage high at pre-launch through OMS-2 burn. During STS-109 pre-launch preparations, the right OMS aft fuel gaging probe was noted to be failed OSH during fuel loading for that flight, and the totalizer showed a similar bias. Prior to loading during STS-109, the aft fuel probe electronic module gave an out-of-spec voltage reading. This condition was waived preflight STS-109 (WK10098R1). Therefore, this signature is the same as seen on the last flight.

STS-107
OMS/RCS Launch Report

RCS PRESSURIZATION LEG **FRCS: A** **LRCS: A** **RRCS: A**

AFT RCS INTERCONNECT CONFIGURATION: Straight feed.

23 of 38 primary thrusters have been fired. The following Primary thrusters were fired during ascent:

F1F		**L1A**	**X**	**R1A**	**X**
F2F		**L3A**	**X**	**R3A**	**X**
F3F		L1L		R1R	
F1L		L2L		R2R	
F3L	**X**	**L3L**	**X**	**R3R**	**X**
F2R		L4L		R4R	
F4R	**X**	**L1U**	**X**	**R1U**	**X**
F1D	**X**	L2U		R2U	
F2D	**X**	L4U		R4U	
F3D	**X**	**L2D**	**X**	**R2D**	**X**
F4D	**X**	**L3D**	**X**	**R3D**	**X**
F1U	**X**	**L4D**	**X**	**R4D**	**X**
F2U	**X**				
F3U	**X**				

STS-107 FD1 EPDC Shift Report

During the Launch/Post Insertion time period, AC2 phase B exhibited "sluggish" current increase during motor operation on three motors. AC2 phases A and C would increase to about their expected values, but phase B would increase only about half of expected, then recover to the expected value within about a second.
The affected motors are:

Vent doors 8&9 Motor 2 (cb10 AC2 AMC2, Pnl MA73C:D)
KU Band Deploy Motor 2 (cb9 AC2 MMC4, Pnl MA73C:D)
Port PLB Door Open Motor 2 (cb7 AC2 MMC2, Pnl MA73C:C).

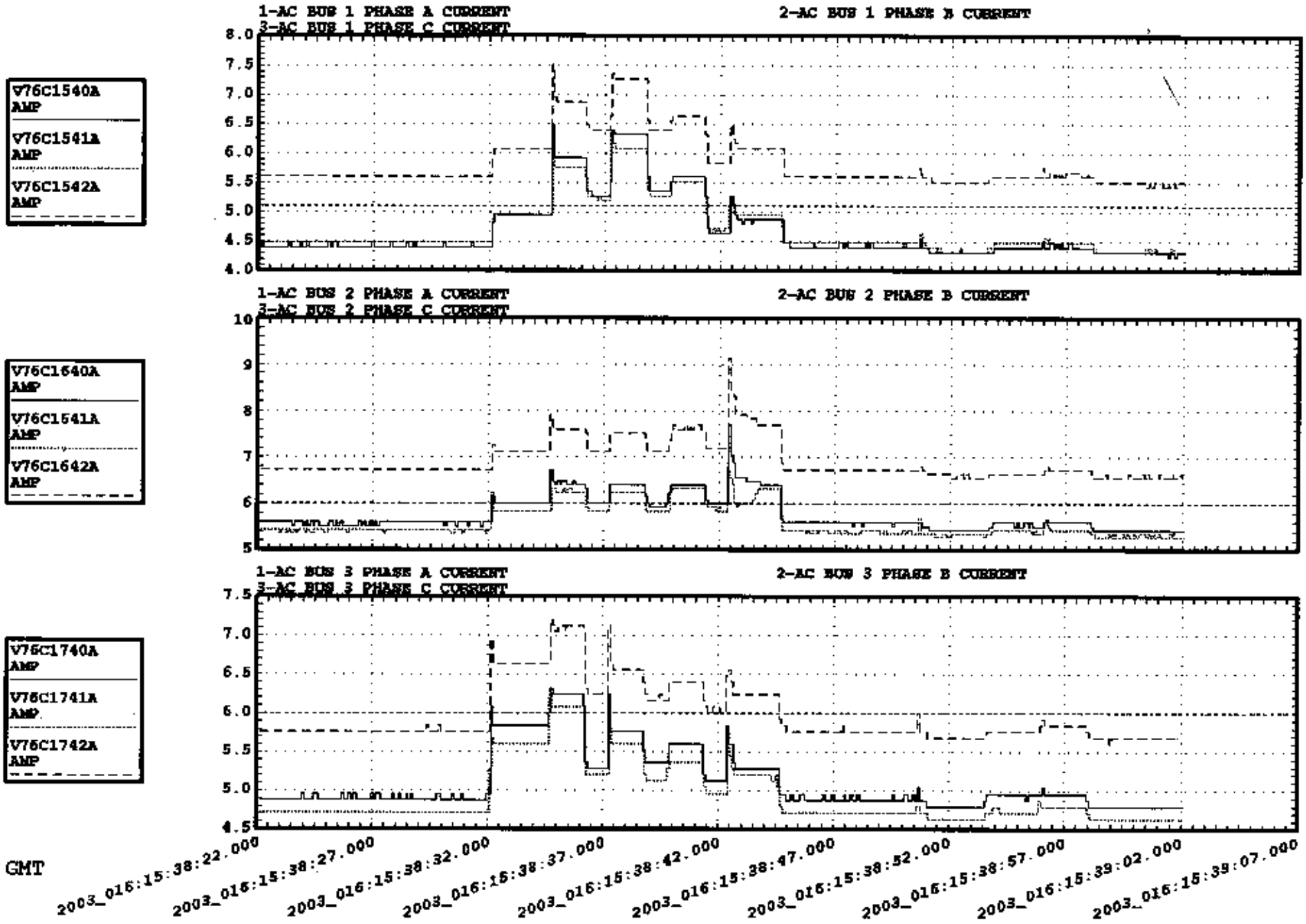
As can be seen from the affected motors, there is no common circuit breaker/Motor Control Assembly. All of the motor control assembly AC circuit breakers are located on Panel MA73C. All of the other motor signatures analyzed so far look normal except the above three. Some of the normal signatures are for motors powered from the same circuit breaker/motor control assemblies as the affected motors. So far, no commonality has been found.

Larry Minter

Pre Launch Vent Drs

AC BUS 1, 2, & 3 CURRENTS

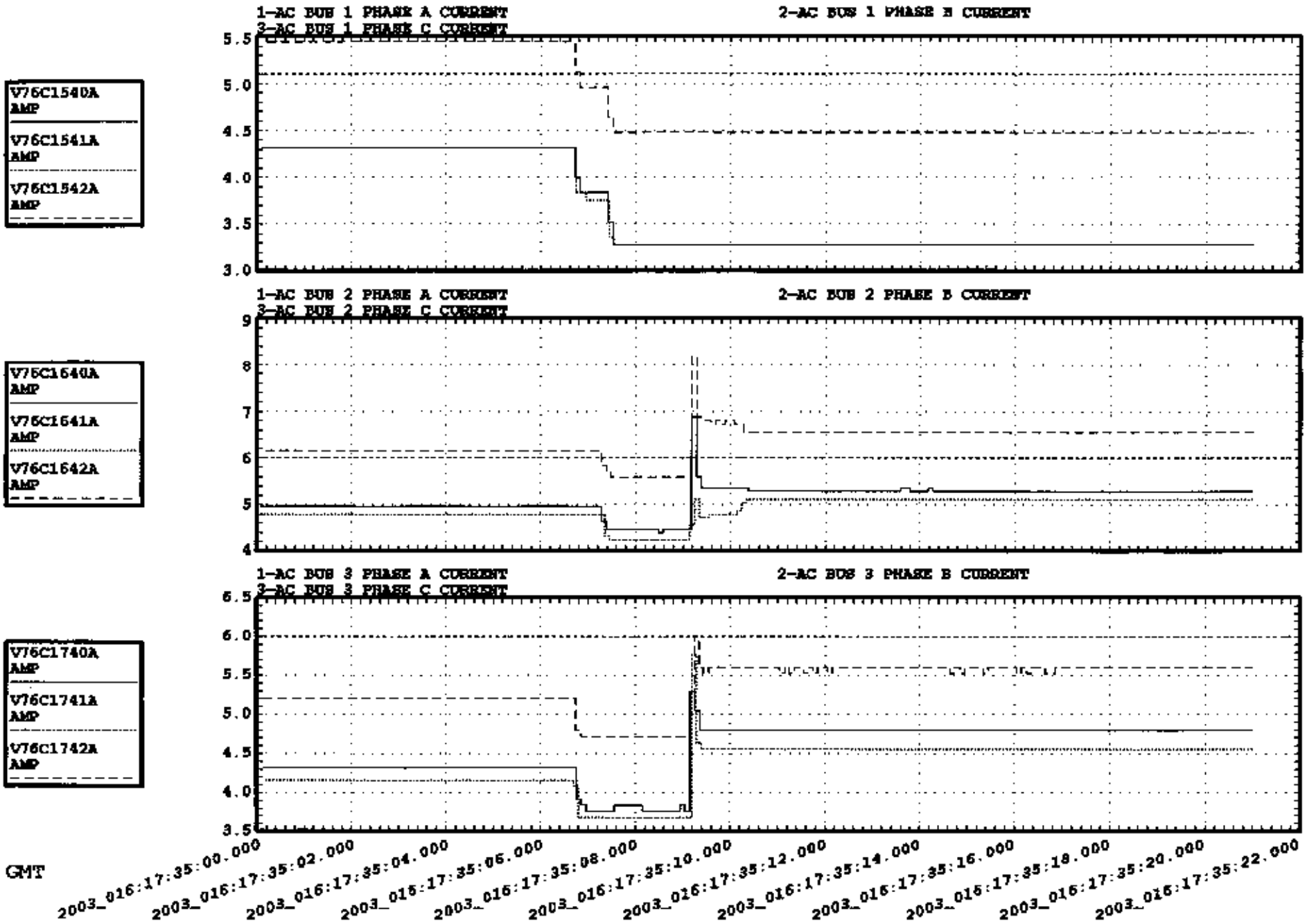
MEWS	SAMPLE RATE: 0 (sec/sample)	Subsystem: epdc
FORMAT: AC AMPS	DATA: _AC2_ASCENT	Flight: STS-107



PLB Port Dr. Mtr. 2

AC BUS 1, 2, & 3 CURRENTS

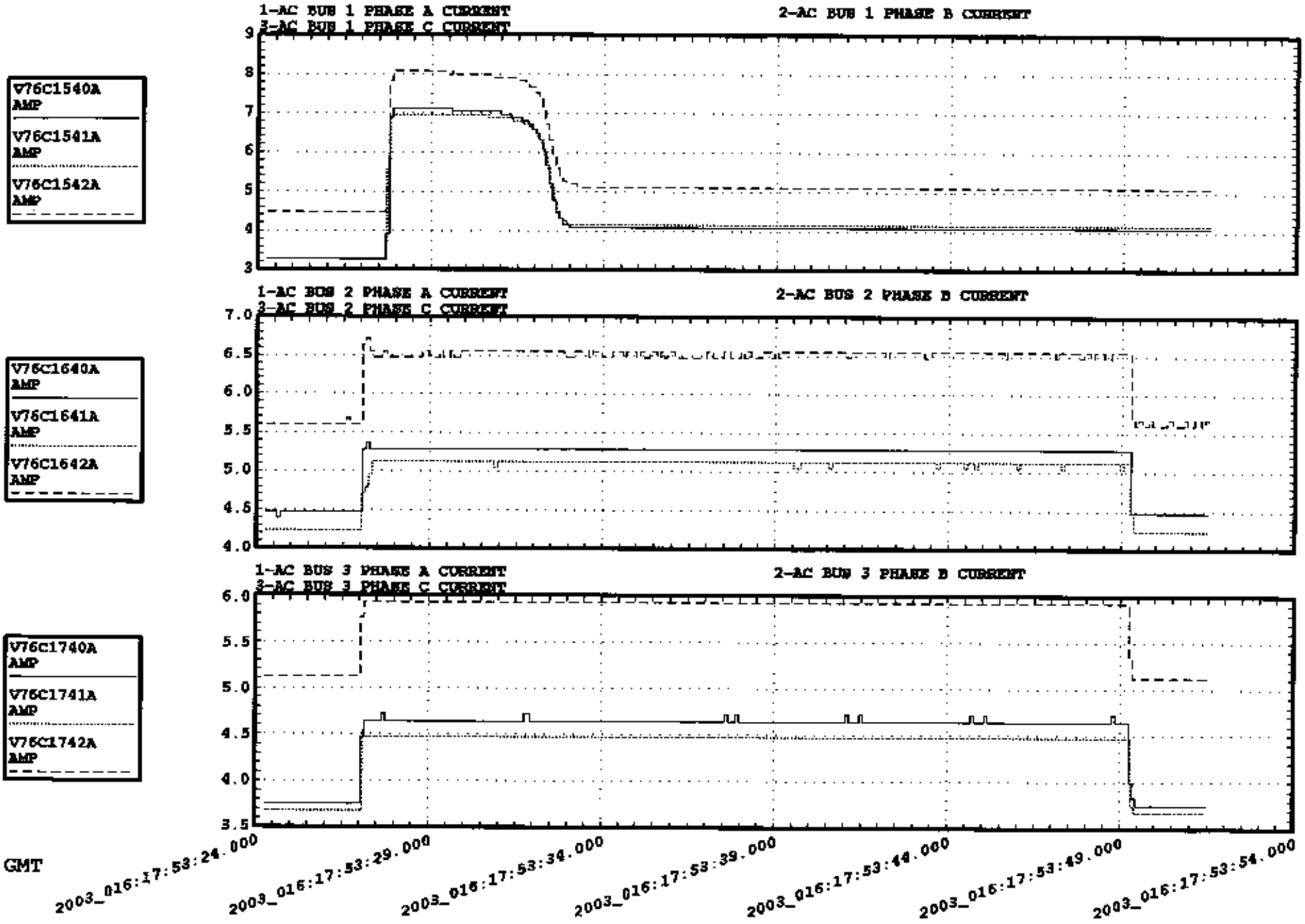
M E W S	SAMPLE RATE: 0 (sec/sample)	Subsystem: epdc
FORMAT: AC_AMPS	DATA: _PLBD_AC2	Flight: STS-107



KU-Bd Ant. Deploy Mtr 2

AC BUS CURRENT TRACE

M E W S	SAMPLE RATE: 0 (sec/sample)	Subsystem: mech
FORMAT: ACBUS123	DATA: KU_DEPLOY	Flight: STS-107



STS-107 ESD SYSTEMS SHIFT REPORT
DAY 1 SHIFT 2
GMT 017/00:00

Energy Division Subsystems (MPS, RCS, OMS, FC/PRSD, APU, and Hydraulics) continue to function satisfactorily with the following notes or exceptions:

EPDC During the Launch/Post Insertion time period, AC2 phase B exhibited "sluggish" current increases during motor operation on three motors. AC2 phases A and C would increase to about their expected values, but phase B would increase only about half of expected, then recover to the expected value within about a second.
The effected motors are:

Vent doors 8&9 Motor 2 (cb10 AC2 AMC2, Pnl MA73C:D)
KU Band Deploy Motor 2 (cb9 AC2 MMC4, Pnl MA73C:D)
Port PLB Door Open Motor 2(cb7 AC2 MMC2, Pnl MA73C:C).

As can be seen from the effected motors, there is no common circuit breaker/Motor Control Assembly. All of the motor control assembly AC circuit breakers are located on Panel MA73C. All of the other motor signatures analyzed thus far, appear normal except the above three. Some of the normal signatures are for motors powered from the same circuit breaker/motor control assemblies as the effected motors. So far, no commonality has been determined.

Tom Davies
ESD Team Lead

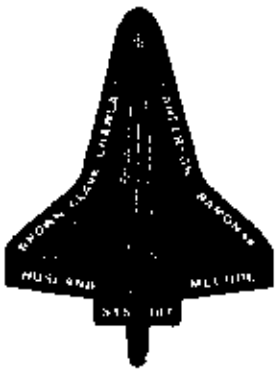
STS-107 MER Thermal 2nd Shift Report

017/01:00 GMT, 19:00 CST 01/16/2003

All thermal systems are performing nominally and all temperatures are within acceptable limits.

FYI - The actual launch trajectory is off from the pre-flight calculated trajectory in the current ATL. Pointing is working to correct the problem and expects that the whole mission will be corrected by the middle of the flight. The lagging vectors affect the inertial attitude angles resulting in a lower main landing gear tire temperature prediction for EOM. TCS is aware of this issue and is not making any recommendations based on these predictions.

S. Tidwell/G. Gonzales



DPS PASS FSW, MEDS & H/W MER Shift Report

STS-107 **Date: 1/16/2003** **GMT: 017/01:00:00**
Shift: 2nd

SYSTEM STATUS / ISSUES BEING WORKED

- All DPS systems performing nominally.

DPS Team Lead: Betty Pages **Signature:** Betty Pages

MER Shuttle Safety Console
STS-107 FD 1 Shift 2
GMT

The MER Safety Console is not working any safety of flight issues.

Ross Engle

ORBITER ECLSS

STS-107 ECLSS SHIFT REPORT

FLIGHT DAY 1

SHIFT 2

All ECLSS systems performing nominally.

Consumables:	Supply water	279	lb.
	Waste water	34	lb.
	Orbiter Nitrogen	257	lb.

Karen Thacker
GMT 017/01:51

MER Shift Reports

STS-107

Day 1 Shift 3

MER Shuttle Safety Console
STS-107 FD 1 Shift 3
GMT 017/08:50:00

The MER Safety Console is not working any safety of flight issues.

Jeff Peters

STS-107 ESD SYSTEMS SHIFT REPORT
DAY 1 SHIFT 3
GMT 017/09:00

Energy Division Subsystems (MPS, RCS, OMS, FC/PRSD, APU, and Hydraulics) continue to function satisfactorily.

John Norris
ESD Team Lead

Thermal 3rd Shift Report

STS-107, January 17, 2003
3 AM, MET 00/17:21 (17/09:00 GMT)

All temperatures are within acceptable limits and all thermal systems are operating nominally.

Tim Davies / Dave Norman

ORBITER ECLSS

STS-107 ECLSS SHIFT REPORT

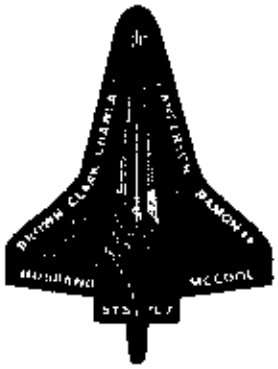
FLIGHT DAY 1 & 2

SHIFT 3

All ECLSS systems performing nominally.

Consumables:	Supply water	293.4 lb.
	Waste water	41.3 lb.
	Orbiter Nitrogen	256.7 lb.

Group Leader
GMT 017/08:56



DPS PASS FSW, MEDS & H/W MER Shift Report

STS-107 **Date: 1/17/2003** **GMT: 017/09:00:00**
Shift: 3rd

SYSTEM STATUS / ISSUES BEING WORKED

- All DPS systems performing nominally.

DPS Team Lead: Christy Limero **Signature:** Christy Limero